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asked him how he got the air in that sprinkler head, and was told that there was a valve cut in the shape of a funnel that fits over the top where the 6-inch pipe comes into the valve. When the water is on from the 6-inch water supply the pressure is about 90 pounds, but the air pressure is only 35 pounds on the sprinkler heads, and the difference in area of the valve that governs the 6-inch opening is sufficient to make up the difference of 55 pounds to the square inch on the contrivance that holds the valve. It was also stated that the valve could not be closed suddenly, but it was found that in trying the sprinkler heads when the air was exhausted it did shut off the sprinkler heads and the water supply very suddenly. The installation of an air chamber was insisted on and after it was installed the trouble ceased.

LEAKY PLUMBING

Enforcing rules concerning leaks in plumbing, by fines, shutting off water or other means.

General discussion of inspection of plumbing and reduction of leaks in unmetered buildings.

MR. JACOB KLEIN:¹ Investigation shows that more than fifty per cent of all waste of water in cities is due to leaky plumbing and to water loss from roof tanks. Leaking toilet tanks are the cause of a large proportion of this loss. Leakage in toilet tanks is not easily discovered, as some types are almost noiseless. Careless management within buildings, especially during periods of extreme temperatures when faucets are allowed to run full in order to draw the water, hot or cold, as required, is also the cause of the loss of a large amount of water.

Owners of buildings when installing their piping should be required to space the hot and cold water lines at least one foot apart. When owners make their application for use of water, they should be required to sign an agreement to prevent all waste of water and waive claims for damage caused by shutting off the supply in case of failure to comply with the notices to repair leaks.

House to house inspection to detect leaks in fixtures and unnecessary use of water in buildings has been found effective.

Inspectors assigned to examine plumbing in buildings should be

¹Chief Inspector Bureau of Water, New York City.

familiar with its installation, and also have a knowledge of apparatus consuming water.

Notice should be left by the inspector with the owner or occupant when leaks are discovered, or when apparatus requiring water for its motive power is found in unmetered buildings. Notices in duplicate and carbon copied by the inspector in the field, have been found practical. When an inspector finds leaks on account of defective plumbing, or locates a water motor or ram in an unmetered building, a notice should be left notifying the occupant that the leaks are to be repaired and the apparatus removed within three days from the date of service, or a penalty of Two dollars per day would be imposed for each and every day such waste is allowed to continue. If the waste is allowed to continue after the imposition of the penalty, notice should be served that the water supply will be cut off.

Experience has shown that leaks are repaired by the consumer after the first notice is received, and it is only necessary to impose a fine in a small percentage of cases.

MR. J. M. DIVEN: The speaker fully agrees with what Mr. Klein says about leaking toilet tanks being the cause of a large portion of the waste due to leaky plumbing. As a test of this he on several occasions put meters on direct supply to toilet tanks both at his own residence and at waterworks offices. One such tank recorded a flow of over 1100 gallons per twenty-four hours. This tank had been specially fixed to cause the large leak, but while this leak was going on there was no annoyance, from noise or otherwise; nothing that would cause a consumer to repair the closet for his own protection. This, of course, is an extreme case, but is a possibility. The city pressure where the test was made ranged from forty to fifty pounds.